

Week 1: The Fundamentals

Chapter 1: Introduction: Matter and Measurement

Chapter 2: Atoms, Molecules, and Ions

It is very important that students learn the basic terms and concepts in the beginning of the course. However, this material should not be new to them because it was introduced in their first-year chemistry course. Therefore, very little time should be needed to refresh their memories and grasp these fundamentals.

College Board Performance Objectives:

- Distinguish between physical and chemical properties and changes.
- Understand the difference between elements, compounds, and mixtures.
- Be familiar with the units of the metric system of measurement and the temperature scales.
- Be able to convert measurements, especially within the metric system, by using dimensional analysis.
- Determine the number of significant figures in a measurement and be able to express the results of a calculation with the proper number of significant figures.
- Distinguish between protons, neutrons, and electrons, and be able to describe the composition of an atom of any particular element in terms of these subatomic particles.
- Describe the basic anatomy of an atom and the ratio of the diameter of the nucleus to that of the atom.
- Know the difference between an atom, an ion, and a molecule.
- Have a basic knowledge of the periodic table, which includes being able to predict whether an element is a metal or a nonmetal, and what will be the probable charge of its ion.
- Distinguish between empirical, molecular, and structural formulas.
- Be able to write the correct name of an inorganic compound from its formula and vice versa.
- Define hydrocarbon, alkane, and alcohol and be able to write the name from the formula and vice versa for simple alkanes and alcohols.

College Board Lab Objectives:

- Learn some of the procedures used in observing physical properties and how they are used to identify substances.
- Become acquainted with the methods of separating the components of a mixture (decanting, extraction, and sublimation).

Troubleshooting Tips/Error Traps:

- **Mass number, atomic mass, and atomic weight are not synonymous.**
- **Only molecular substances have molecules.**
- **Mixing doesn't mean reacting. Only if a new substance forms is it a chemical reaction.**
- **Mass and volume are not the same thing.**
- **Calculators ordinarily display more digits than are significant.**
- **Normally, treat conversion factors as exact numbers.**